Figure 1 is a block diagram of a presently preferred signal processor of a sonar system in accordance with this invention. The matched-filter processor, shown in Figure 1, by exhibiting a target return having a non-zero velocity, also becomes a moving target classifier.

A broadband airgun system, such as described in Bouyoucos US Patent 5,995,452, issued Nov. 30, 1999 (hereby incorporated by this reference), can provide an unparalleled versatility and robustness. Its inherent broad bandwidth enables the Figure 1 matched-filter processor to expose the optimum detection band(s) at any given instant in time for detection of moving targets, especially in the littorals. Additionally, the use of its full bandwidth on a single shot basis can provide one of the best ways to detect a stationary, bottomed or hovering target.

The single beam input is the detailed return signal from a hydrophone or hydrophone array. A bank 10 of band pass filters divides the broadband 50–600 Hz return signal into separated 50 Hz bands, the center frequencies of which are given in each of the eleven filters shown in Figure ~~Ø~~ 1. Separate matched filters 12 provide a matched processor. While an analog processor is shown the processors may be digital processors of the type typically used for sonar matched filter detection.

Another detector 14 selects the strongest non-zero target velocity outputs from the processor 14. This automatically seeks 50 Hz band(s) yielding simultaneously the best joint combination of target and propagation response.

A range and azimuth detector 16 of the type conventionally used processes three optimum outputs over a threshold strength to detect azimuth range. A type of combination of outputs and resulting azimuth and range is shown in Figure 1.